

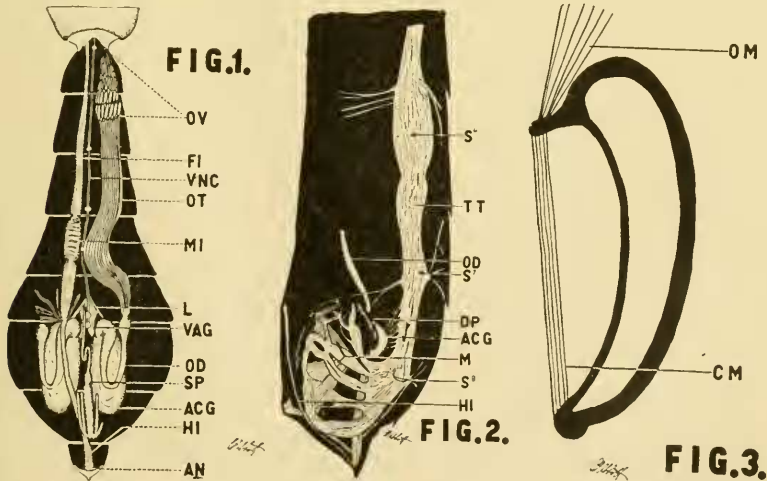
ANATOMICAL MODIFICATIONS ASSOCIATED WITH THE OVIPOSITION OF MEGARHYSSA LUNATOR.

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Observing the oviposition of *Megarhyssa lunator*, one is startled by the apparent resiliency of her abdomen. As the latter is elevated, forming approximately a right angle with the thorax, the looped ovipositor lies within the intersegmental membranes, doubling the eighth segment and its associated structures back against the body. This at once suggests that the internal organs must be modified to withstand considerable stretching and torsion. It was with the object of verifying this conclusion that the following study was undertaken.

Specimens were fixed in Bouin's solution and preserved in 70 per cent. alcohol. Fresh material was used for study of the tracheal system. A binocular magnifier, giving a magnification of 40 diameters, was used.

The *ovarioles* (Fig. 1, *OT*), or individual tubes of the ovaries, extend from the thorax to the sixth segment of the abdomen. There are a considerable number of them. That portion of each ovariole that occupies the second and third segments is filled with elongate oval eggs in various stages of development (Fig. 1, *OV*). Due to the fact that they are slightly longer than the portion of the body they occupy, the tubes are somewhat coiled. In the sixth seg-



ment the ovarioles of each ovary fuse, forming an oviduct (Fig. 1, *OD*). Just posterior to the point of fusion, the oviduct is bulbously expanded, forming the *egg calyx*. Near the posterior margin of the eighth segment each oviduct *doubles back*, and passing forward to the anterior margin of the same segment, again doubles back before entering a large sack, the *accessory gland* (Fig. 1, *AC, G*). Anteriorly the gland is continuous with the *vagina* (Fig. 1, *VAG*), a wide, thin-walled tube that opens to the exterior of the body between the lancets. Between the accessory glands, and very near the terminus of the abdomen, lies the *spermatheca* (Fig. 1, *SP*). Its posterior is continuous with several digitiform processes that are doubtless glandular. The body of the spermatheca is cylindrical and nearly transparent; anteriorly it continues as a slender tube communicating with the vagina. Its dark color indicates the presence of a chitinous intima. The vagina and the spermatheca are the only single reproductive organs; all the others are paired.

The organs described above have considerable *slack*, that is, they can be stretched considerably without danger of being ruptured. Even the tube of the spermatheca is slightly coiled.

The digestive and nervous systems, although they are not coiled, exhibit considerable slack. The midgut (Fig. 1, *MI*), which occupies the fifth and sixth segments, though heavy-walled, is much wrinkled; the remaining parts of the system are not only much wrinkled but thin and membranous.

The two terminal ganglia of the central nervous system (Fig. 1, *VNC*) lie close together upon the dorsal surface of the vagina. The fine fibers which connect them with the organs of that region, are, because of their tenuity, not easily broken.

The heavy musculature of the ovipositing mechanism requires a plentiful supply of oxygen, which is furnished by the heavy tracheation of this region (Fig. 2). The spiracles (*S*⁶, *S*⁷, *S*⁸) of this portion of the abdomen are all large; that of the eighth segment especially so. The figure shows the tracheation of the *right* side of the abdomen as viewed dorsally, with the ovipositing mechanism split and the right half tipped to the right to expose the ental surface. Actually that part of the tracheal trunk (Fig. 2, *TT*) lying between the large spiracle of the eighth segment and the drill plates is folded longitudinally with the bend directed ventrally between the wall of the abdomen and the outer wall of the drill plate. The larger tracheae are thin-walled, wrinkled, and slightly papillose. In a dissected specimen they are more or less collapsed, so that their appearance is flat rather than cylindrical.

Each spiracle is equipped with a closing apparatus, especially conspicuous in that of the eighth segment (Fig. 3). *OM* represents the muscle which opens, *CM*, that which closes, the spiracle.

In conclusion we may summarize the above observations by noting that in the female *Megarhyssa* abdominal modifications have taken place in two directions: (1) by the development of *slack* as illustrated, for instance, by the coiling of the reproductive ducts, and (2) enlargement of the tracheal system in response to the need of heavy musculature for oxygen. The peculiarities of the terminal segments of the abdomen of this insect illustrate the remarkable modifications that follow the extreme development of specialized structures.

ALMOST A CANNIBAL.

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On May 12, 1932, a *Meloë montanus* Lec., fat and very much alive, was brought to me with a smaller beetle clinging tightly to the sutural edge of its right elytron. The little one proved to be *Pedilus monticola* (Horn); a few days later a second couple turned up, and on May 1st, 1933, another *Pedilus*-ridden *Meloë* was taken. Examination shows that in each of the three cases the elytra of the *Meloë* have actually been eaten away by the *Pedilus*. The 1933 specimen has lost the apical third and a smaller basal part of the left elytron, and some of the right; one of the 1932 examples shows a ragged edge from base to apex of the sutural margin of each elytron, and jaw marks breaking right through the integument all along the outer margins.

There is absolutely no doubt that the damage was done by the *Pedilus*, for in each case the offender was discovered in place, with jaws clenched in the host's wing case. Specimens of *P. monticola* Lec., are here most commonly found on flowers of the Black Hawthorn (*Crataegus brevispina* (Dougl.)), and their fall to the flesh-pots of beetle life must be rare, for of sixty-seven examples of *Meloë* before me, all collected at Salmon Arm, B. C., none but the three already mentioned shows the ragged gnawing feeding-marks of *Pedilus*.